

REMARKS

Claims 1 - 6 are currently pending in the application. Claim 1 has been amended and claims 4 - 6 have been withdrawn from consideration. Accordingly, claims 1 - 3 are presented for reconsideration and reexamination in view of the following remarks.

In the outstanding Office Action, the Examiner objected to the title of the invention; and claims 1 - 3 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Publication No. 2002/0024640 to Ioka.

By this Amendment, the title of the invention is amended; the last paragraph on page 11 of the specification has been amended; claim 1 is amended; and the prior art rejection is traversed. Support for the amendment to the specification can be found in paragraph [0059] of the Japanese Application No. 2004-8427. The added phrase was omitted from the English translation. Support for the amendments to claim 1, which is characterized by the configuration of a three-dimensional measuring unit (17) and image transforming means (11a, 11b,...), can be found for example on page 10, lines 5 - 14, page 10, line 28, page 11, line 32, and Figures 9 - 12.

It is respectfully submitted that the above amendments introduce no new matter within the meaning of 37 U.S.C. § 132.

Objection to the Title

The Examiner objected to the title of the invention as not being descriptive.

Response

In response, the title has been amended to --PROJECTION DISPLAY DEVICE FOR DISPLAYING IMAGE ON NONPLANAR SCREEN WITH A PLURALITY OF PROJECTION DISPLAY UNITS--.

As Applicants have amended the title to one that is clearly indicative of the invention to which the claims are directed, Applicants respectfully requests that the objection of the title be withdrawn.

Rejection under 35 U.S.C. § 102(b)

The Examiner rejected claims 1 - 3 as being anticipated by Ioka.

Response

Reconsideration and withdrawal of the rejection is respectfully requested.

For a reference to anticipate an invention, all of the elements of the claimed invention must be present in the reference. The test for anticipation under section 102 is whether each and every element as set forth in the claims is found, either expressly or inherently, in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

Applicants submit that Ioka fails to disclose each and every element of the claims.

According to the present invention, a projection display apparatus has a three-dimensional measuring unit 17 that three-dimensionally measures images displayed by the projectors 1 to n. A three-dimensional measuring unit 17 sends information photographed by monitoring cameras to the control PCs 21 and 22 and controller 19. According to the signal representative of a three-dimensional measurement result from the three-dimensional measuring unit 17, the control PCs 21 and 22 control the geometric converters 11a to 11i. Therefore, the three-dimensional measuring unit (17) measures three-dimensional positions of images projected and displayed by the plurality of projection display units to output a measurement result of the three-dimensional positions. See page 10, lines 5 - 14 and lines 28 - 32.

A geometric conversion unit 11 serves as an image transforming means for conducting geometric conversions on a video signal and supplying the converted signals to the projectors 1 to 9. Image transforming means (11, 11a, 11b,...) determines image transform quantities of the images represented with the divided video signal divided by the image dividing unit based on the measurement result of the three-dimensional positions output from the three-dimensional measuring unit and position information of an audience to change field angles of the images based on the image transform quantities so that a composite image on the nonplanar screen composed of the images displayed by the plurality of projection display units becomes optimum when seen by the audience. See page 8, line 31 to page 19, line 19.

When images from a plurality of projection display units are combined to compose a large-size display image, even if a nonplanar screen such as a concave spherical screen is used, it is

possible to display a normal, high-quality, high-resolution image as seen from audiences. See page 7, paragraph beginning on line 3.

Since re-reflection to a nonplanar screen can be reduced as much as possible, it becomes possible to prevent reduction of contrast of the displayed image. See page 8, paragraph beginning on line 23.

Amended independent claim 1 of the present application, recites a combination of features, *inter alia*, “a three-dimensional measuring unit for measuring three-dimensional positions...to output a measurement result of the three-dimensional positions; and image transforming means for changing the field angle of images...based on the measurement result...and position information of an audience, so that a composite image...becomes optimum when seen by the audience...”

Ioka discloses an image projection display apparatus using plural projectors and a projected image compensation apparatus. The image projection display apparatus is configured with a plurality of projectors 3a to 3d, a projection screen 4, an image capture unit 5, an input image divider 12, an image compensator 13, a compensation data calculator 16, and a compensation data memory unit 17. The screen 4 may be flat, cylindrical, spherical, or any other surface. See paragraphs [0041], [0045], and [0050].

In Ioka, display-base images are planar images and the base images (planar images) are deformed (converted) to be composed. Accordingly, these images are seen deformed on a screen occupying the three-dimensional space such as a nonplanar screen including an arch-type screen and a dome-type screen when seen by audiences. In other words, irregular two-dimensional images are converted into a composite image, which does not consider eye points of the audiences, to be

generated on a screen occupying the three-dimensional space. Straight lines in the base images are seen as not straight but curved lines by audiences.

In order that images on the planar surface can be converted into an image for a screen occupying the three-dimensional space, three-dimensional position information including X, Y, Z axes is required, however, this is not considered in Ioka nor is it mentioned anywhere in the reference. Hence, the method in Ioka is completely inappropriate for three-dimensional images.

On the other hand, in the present invention, a field angle of a displayed image is changed (geometrically converted) based on the measurement result of the three-dimensional position of X, Y and Z axes, which is different from the cited reference. Accordingly, the present invention makes it possible to perform conversion such that a straight line in a base image is seen as it is (straight line) by audiences.

Further, in the present invention, it is possible to generate correct images by a method of mapping planar images on a virtual original planar surface and then to generate a three-dimensional image taken by stereo cameras or the like on a nonplanar (curved, hemispherical and the like) screen properly. See for example, page 11, lines 19 - 22.

Further, according to the present invention, as multifaceted high-quality video signals of not only live-action images but also CG (Computer Graphic) images are geometrically converted, it is possible to generate a high-resolution three-dimensional image of multifaceted images on the nonplanar (curved surface, hemispherical-dome) screen. This is because geometric conversion is performed using measurement data of three-dimensional positions of X, Y and Z axes in order to generate a three-dimensional space accurately. See for example Figure 12.

Fundamentally, in Ioka, matching of areas on the curved surface is performed only by geometrically converting planar images, thus the eye point of an audience, the size and the shape are not converted properly. Therefore, a composed image presents unnaturalness to audiences.

From the description of the reference as discussed, Ioka does not disclose the unique configuration of claim 1 of the present invention, and therefore, it is difficult for the configuration of the cited reference to exert effects unique to the present invention.

It is respectfully submitted that Ioka fails to disclose each and every element of independent claim 1.

Moreover, as claims 2 and 3 depend from independent claim 1, Applicants submit that these claims are allowable for at least similar reasons.

Therefore, Applicants request that the rejection of claims 1 - 3 under 35 U.S.C. § 102(b) be withdrawn.

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned attorney if it is believed that such

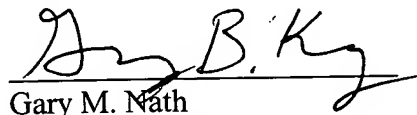
contact will expedite the prosecution of the application. Favorable action with an early allowance of the claims is earnestly solicited.

Respectfully submitted,

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